Reconstruction Computation of Thermal Conductivity Depth Pro¯les by Surface Photothermal Signals

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ABSTRACT

In the recent years, the problem of inverse calculations of continuously inhomogeneous thermal conductivity distributions from some data has attracted considerable interest. Most of those inversion methods often assume a mathematical model for unknown distributions to ¯t the measured data by changing some parameters; or they use some iterative algorithms (for example, PST method) from the detected modulated photore°ectance data without assuming distribution model. However, in fact, we do not know the distribution of thermal conductivity before searching, thus it is very di±cult to ensure the convergence of iterative methods.

In this paper, a numerical approximation algorithm for the inverse calculation of the continuously inhomogeneous thermal conductivity distributions is established. For simplicity, we only consider thermal one-dimensional inhomogeneous opaque solid samples. Numerical results by surface photothermal signals show that the method or algorithm is more e®ective and feasible.